

REMARKS

The following remarks are being submitted as a full and complete response thereto. Claims 1-4, 6, 7, 10-18, 21-22 and 24-29 are pending. By this Amendment, Claims 1 and 14 have been amended. Support for the amendments to the claims may be found at least in the second paragraph of page 8 and the third full paragraph of page 9 of the application as originally filed. Applicants respectfully submit that no new subject matter is presented herein.

Claim Rejection -- 35 U.S.C. 103

Claims 1-2, 7, 10 & 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 4,850,288 to Hoffert et al. (Hoffert) in view of US Patent No. 5,326,254 to Munk; Claims 3-4, 6, 12-13 & 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffert in view of Munk, and further in view of US Patent No. 6,848,375 to Kasin; Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffert in view of Munk as applied to Claims 1-2 above, and further in view of US Patent No. 4,022,591 to Staudinger; Claims 14, 16, 18 21-22 & 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffert in view of Munk, and further in view of US Patent No. 6, 883, 443 to Rettig et al (Rettig); Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffert in view of US Patent No. 6, 145, 452 to Heger et al. (Heger); Claims 17 & 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffert in view of Munk as applied to claim 16 above, and further in view of Kasin; and Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffert in view of Staudinger. Applicants respectfully traverse the rejections for at least the following reasons.

The final Office Action, dated May 6, 2010, asserts that Hoffert discloses all the features of Claim 1 except for recycled gases being supplied to the combustion reactor or water being injected into the recycled gases to raise the concentration of water in the recycled gases. The Office Action looks to Munk to cure the stated deficiencies of Hoffert, asserting that Munk teaches recycling flue gases to a combustion chamber and water being injected into the recycled gases to raise the concentration of water in the recycled gases and, therefore, it would have been obvious for one of ordinary skill in the art at the time of invention to combine the combustion apparatus of Hoffert with the flue gas humidification/ recirculation of Munk because such a combination would have produced the added benefit of reduced NO_x emissions and a more efficient combustion process.

Hoffert teaches a burner for burning solid fuels wherein fuel particles having higher mass are retained for very long periods of time relative to the combustible volatiles (col. 2, lines 18-23). A combustion process taught by Hoffert provides for high volumetric heat release rates approaching those for liquid and gaseous fuels (col. 3, lines 25-27). The combustion method taught by Hoffert is a pressurized cyclonic combustion method, wherein clean pressurized hot effluent gases are produced that can be expanded in a gas turbine to produce power (e.g., see the Abstract). The burner apparatus is a cylindrical pressurized burner which utilizes helical flow patterns to provide prolonged combustion of the fuel solids and uses an intermediate choke zone and an air quench step to improve combustion and control temperature of the produced effluent gases (col. 1, lines 17-26).

The burner, or primary combustion chamber, operates at a pressure from 3 atm to 20 atm (col. 3, lines 38-43). The burner combustion chamber terminates with a choke opening 20a (Fig. 1) (col. 4, lines 53-54). The position of the choke opening can also be changed to facilitate the passage of ash from the primary combustion chamber (col. 6, lines 56-58). Downstream from the choke, there is the secondary combustion chamber (col. 4, lines 62-63)

The Applicants again note that the technical problem addressed by Hoffert is to provide very high volumetric heat release rates approaching those for liquid and gaseous fluid (col. 3, lines 26-27). As such, the technical problem addressed by Hoffert has nothing to do with the technical problem solved by the present invention. Moreover, Hoffert does not teach or suggest the production at the mouth of the reactor of combustion fumes with total organic carbon of the order of parts per million and wherein a fraction of dust that is entrained out of the reactor with combustion fumes is reduced to a negligible value, as recited by Claims 1 and 14. In fact, Hoffert does not address total organic carbon (TOC). As to fly ash, Hoffert discloses that the fly ash is removed downhill from the combustor by a cyclone. Therefore, the combustion process of Hoffert produces fly ash, which is specifically avoided by the claimed invention. The combustion process of Hoffert does not reduce to a negligible value the fraction of dust that is entrained out of the reactor with the burnt gases at the mouth of the reactor. It is the process of Claims 1 and 14 that produces discharge gases from the reactor having reduced TOC and fly ash that permits discharging the gases to the atmosphere without any post-treatment. Rather, Hoffert discloses that it is essential to use the cyclone apparatus to remove the dust, which is unnecessary with the present invention. In other

words, the flue gases of the combustor in Hoffert, before being discharged in the atmosphere, are subjected to the compulsory post-treatment to reduce the TOC and the ash. Only in this way can the Hoffert plant be used in an industrial setting.

Accordingly, the Applicants respectfully submit that Hoffert fails to teach or suggest the features of Claims 1 and 14, and, in particular, a method and plant for treating waste materials that includes a comburent enriched with oxygen and recycled gases, wherein combustion is carried out under isothermal or quasi isothermal conditions and without substantial oxygen deficit, wherein the production at the mouth of the reactor of combustion fumes with total organic carbon is of the order of parts per million, and wherein a fraction of dust that is entrained out of the reactor with combustion fumes is reduced to a negligible value.

The Applicants respectfully submit that Munk does not cure the deficiencies noted above with respect to Hoffert. Munk discloses an apparatus to reduce noxious emissions from a burner. Munk states that it is known to recirculate combustion gases for reducing noxious emissions (col. 1, lines 29-36). However, the fraction of the recirculated gas that can be fed back to the burner input is approximately 25%, since at higher percentages problems of flame stability arise (col. 1, lines 49-52). Munk aims to obtain a further reduction of noxious emissions without undue sacrifice of flame stability and/or burner efficiency (col. 1, lines 58-60).

The solution disclosed by Munk is a fogging device, i.e. an apparatus for producing water/steam, which humidifies the recirculated flue gas (see the Abstract). Munk uses water in the recycled gas in order to decrease the temperature of the flue gas. The Applicants respectfully submit that Munk provides no motivation for one of

ordinary skill in the art to conclude that combining aspects of the process described in Munk with the process described in Hoffert would bring about the solution of the technical problem of the present invention.

Munk is directed to reducing NO_x that is formed in the combustor at high temperatures. In order to decrease the temperature of the combustor, Munk recycles the gases coming out of the reactor and decreases their temperature by adding water (see Munk col. 1). Hoffert is directed to a combustion process carried out at high temperatures, which prevents the reduction of NO_x according to Munk. For this reason alone, one of ordinary skill in the art would not consider it obvious to combine the teachings of Munk with Hoffert, as the high temperatures of Hoffert would not allow for the reduction of NO_x. Furthermore, according to the present invention, high temperature is disclosed as 1500° (C=1773 K=2360° F). Under these conditions, Munk teaches that the NO_x cannot be reduced. Therefore, one of ordinary skill in the art would not consider it obvious to combine Munk with Hoffert as asserted by the Office Action. Moreover, Munk also fails to teach or suggest the combination of features of Claims 1 and 14, and, in particular, wherein a method and plant for treating waste materials includes providing a comburent enriched with oxygen and recycled gases, wherein combustion is carried out under isothermal or quasi isothermal conditions and without substantial oxygen deficit, wherein the production at the mouth of the reactor of combustion fumes with total organic carbon is of the order of parts per million, and wherein a fraction of dust that is entrained out of the reactor with combustion fumes is reduced to a negligible value. It is not a question of whether the reduction of TOC and of ashes or dust being entrained out of the reactor is an added benefit of the present

invention, rather, Hoffert and/or Munk, alone or in combination, fail to disclose the features recited in Claims 1 and 14.

Kasin, Staudinger, Rettig, and Heger are cited for teaching various other features and also do not cure the deficiencies noted above with respect to Hoffert and Munk. Accordingly, for at least the reason(s) provided above, the Applicants respectfully submit that Hoffert, Munk, Kasin, Staudinger, Rettig, and Heger, alone or by any combination, do not disclose, teach or suggest, and teach away from, the features of the present invention, as recited by Claims 1 and 14. As such, the Applicants respectfully submit that one of ordinary skill in the art would not find it obvious to modify Hoffert according to the teachings of Munk, Kasin, Staudinger, Rettig, and Heger, alone or in any combination, because to do so would not arrive at the invention recited by Claims 1 and 14, respectively. Accordingly, the Applicants submit that Claims 1 and 14 should be deemed allowable over Hoffert, Munk, Kasin, Staudinger, Rettig, and Heger.

Claims 2-4, 6, 7, 10-13, 28 and 29 depend from Claim 1; and Claims 15-18, 21, 22, and 24-27 depend from Claim 14. Accordingly, the Applicants respectfully submit that these dependent claims should be deemed allowable for the same reasons that Claim 1 and 14, respectively, are allowable, as well as for the subject matter recited therein.

Withdrawal of the rejections is respectfully requested.

Conclusion

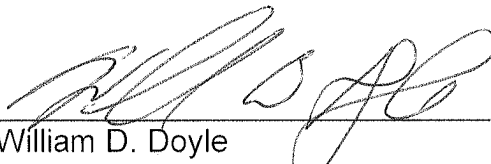
Prompt and favorable examination on the merits is respectfully requested.

In view of the foregoing, Applicants respectfully request reconsideration of the application, withdrawal of the outstanding rejections, allowance of Claims 1-4, 6, 7, 10-18, 21-22 and 24-29, and the prompt issuance of a Notice of Allowability.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing attorney docket number 108907.00043.**

Respectfully submitted,


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